



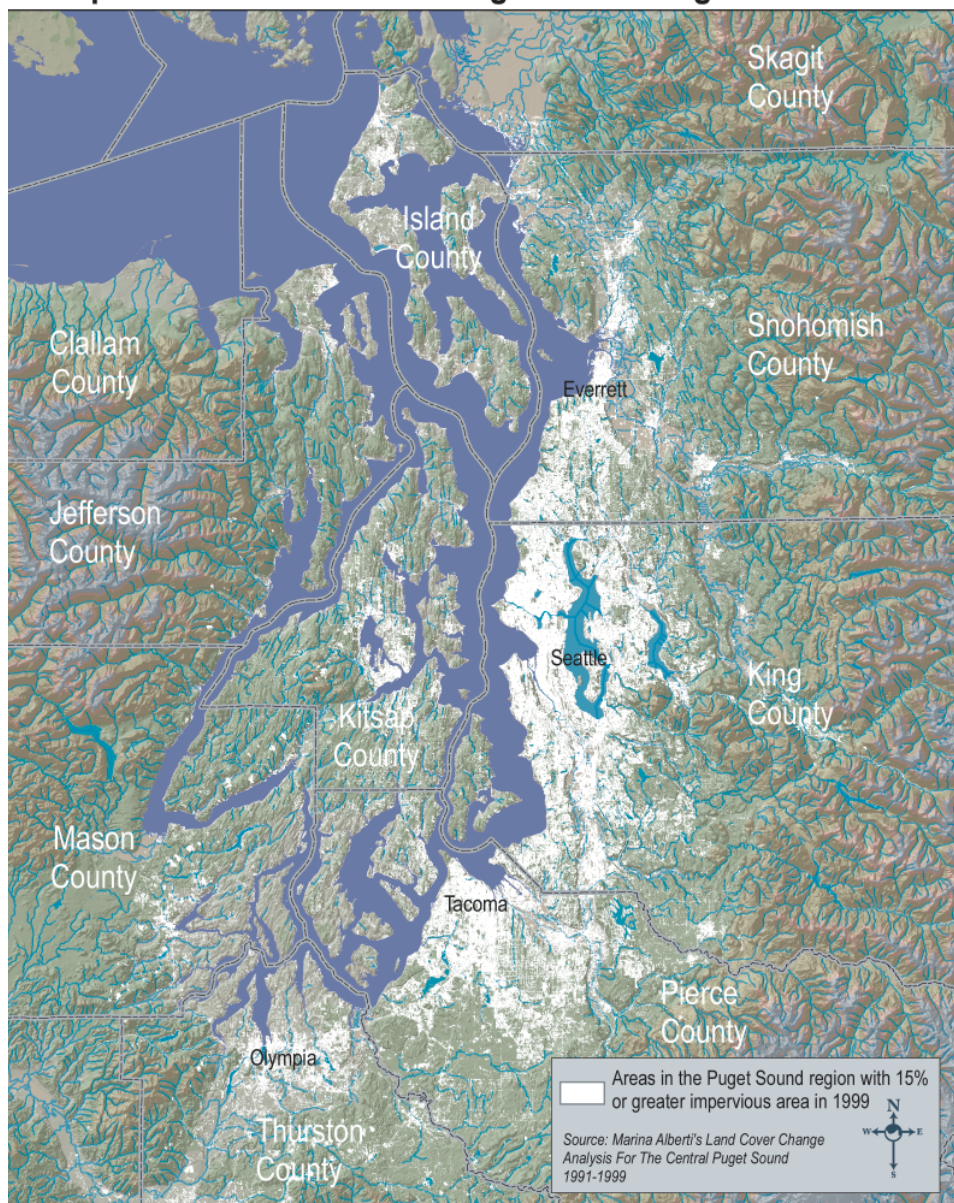
### III. State of the Sound's HABITAT

Puget Sound is bestowed with diversity of habitats. The salt marshes, mudflats, sandy beaches, eelgrass, kelp beds, and rocky-reef habitats each support distinct communities of plants and animals. Habitat is more than the place where organisms live; it is also the collection of dynamic processes that deliver clean water, sunlight, shelter, nutrients, sediment, and other essentials that living organisms depend upon for their survival.

Puget Sound's habitat has suffered losses. One third or about 800 miles of Puget Sound's shorelines have been altered by development.<sup>6</sup> Shorelines have been armored with bulkheads, dredged, or filled in for human uses. Puget Sound has lost 73 percent of its salt marsh habitat since the 1800s with losses approaching 100 percent in urban bays.<sup>7</sup> Many species that rely on nearshore and marine habitats, such as forage fish, marine birds, salmon, and orcas have declined in population. Urbanization is shattering Puget Sound habitat into fragments. As the pieces become progressively smaller and more isolated, they are less able to sustain the ecological processes necessary to support life. Eventually, if they are not reconnected and restored, the pieces lose much of their original value. As a result, the species that depended on these habitats decline in diversity and abundance.

A fractured landscape is also more susceptible to the invasion of foreign species. When species are in their native environment, their populations are usually kept in balance by predators or competitors for food supply. When exotic species land in new regions, they can spread unchecked, crowd out native plants and animals, reduce diversity, and alter the basic nature of the ecosystem.

#### Impervious Surface in the Puget Sound Region in 1999



Source: University of Washington Urban Ecology Research Laboratory

#### Nearshore Habitat Provides Food and Shelter to Species

Nearshore habitat extends from the upper part of the bank, down across the tide-lands and into the water to depths where enough light penetrates to support the growth of algae and submerged plants. There, kelp and eelgrass are the underwater forests and meadows that give food, shelter, and migratory corridors to hundreds of species.

## INDICATOR: Lowland Habitat Loss

The quantity, quality, and interconnectedness of terrestrial and aquatic habitats in the Puget Sound region are all threatened by development. A University of Washington land study evaluated the lowlands (elevation below 500 meters) of the southern eight counties of the Puget Sound basin from 1991 and 1999. This study characterized developed lands based on how much impervious surface (e.g., pavement, roofs) was apparent from satellite imagery. Areas with 15 to 75 percent impervious surface are characterized as moderately developed. Areas with greater than 75 percent impervious surface are considered urban or highly developed.

### Status

The predominant landscape types in the study area are forest (41 percent), grass and shrub (21 percent), and moderately to highly developed (16 percent). This mix reflects conversion of areas that were once forest and prairie, which provide the native habitat for numerous Puget Sound species, as well as agriculture, industrial, commercial, and residential uses. (The pattern of development in the lowlands of Puget Sound is indicated on a map on page 30.)

### Trend

From 1991 to 1999, about 73 square miles, or just over 1 percent of the total area of land in the southern half of the Puget Sound basin was converted from forest, grass, or cropland to moderate or high degrees of development. During this period, this area of the basin lost 240 square miles of forest, or more than 8 percent of the region's forest cover, to development and logging.

## INDICATOR: Eelgrass



Because eelgrass supports so many other plants and animals and plays a critical role in the ecosystem, eelgrass beds are considered a prime habitat. Eelgrass beds grow along the tidelands and shallow water of Puget Sound and are home to a variety of plants, fish, marine birds, invertebrates, and microbes. Eelgrass beds act as corridors for migrating salmon and nursery habitat for species with significant ecological, commercial, and recreational value, such as juvenile salmon and rockfish, herring, and crab.

In the winter, when eelgrass leaves die, the decaying litter provides food for bottom-dwelling animals. Eelgrass roots stabilize sand and mud, and anchor and buffer the beds from storms. Eelgrass is a valuable indicator of estuarine health, because it is sensitive to environmental change. Excess nutrients, sewage, and algae blooms can reduce the clarity of the water and limit the light available to eelgrass. Storms, runoff, and dredging can stir up sediment and also prevent light from penetrating into deeper water. Boat wakes, propellers, and docks can disturb eelgrass beds. Bulkheads and other structures can increase wave energy and alter the sediments where eelgrass grows.

### Status

Since 2000, DNR has monitored eelgrass in Puget Sound at 76 randomly selected sites. DNR tracks the total abundance and depth of eelgrass beds. DNR estimates that approximately 50,000 acres of eelgrass beds are in Puget Sound. The depth of eelgrass beds varies throughout the Sound, depending on environmental characteristics, including light availability in the water column.

### Trend

During the first three years of monitoring, the amount of eelgrass in Puget Sound remained relatively stable. However, between 2002 and 2003, DNR detected a 4 percent Soundwide decline, mainly in north Puget Sound and Hood Canal. At the site level, the majority of eelgrass beds were stable with most sites showing less than 10 percent fluctuation between years. The Action Team partnership is concerned that entire eelgrass beds can be lost very quickly. For example, Westcott Bay on San Juan Island had 35 acres of eelgrass in 2001, but

### Understanding and Responding to Eelgrass Losses

DNR is working with other groups to find the cause of the decline of eelgrass beds in Westcott Bay, and has sampled additional sites in the San Juan Islands to determine if the decline is part of a larger pattern. The agency has proposed more intensive monitoring to better understand stresses to eelgrass beds. It has also proposed developing a seagrass management plan.

## INDICATOR: *Spartina* Infestation

*Spartina* is a type of salt marsh grass that is native to the Atlantic coasts of Europe and North America. People introduced *spartina* to the region as packing material for imported oysters, feed for cattle, and to stabilize shorelines. *Spartina* forms dense colonies that severely limit habitat diversity. When it invades mudflats, it traps sediments and raises the elevation until the habitat is no longer suitable for mudflat species. It can raise a mudflat to heights that cut off shellfish production.

In salt marshes, *spartina* crowds out other plants and results in less diverse animal populations. *Spartina* can quickly form extensive meadows that rob migratory shorebirds and waterfowl along the Pacific flyway of habitat for forage and refuge.

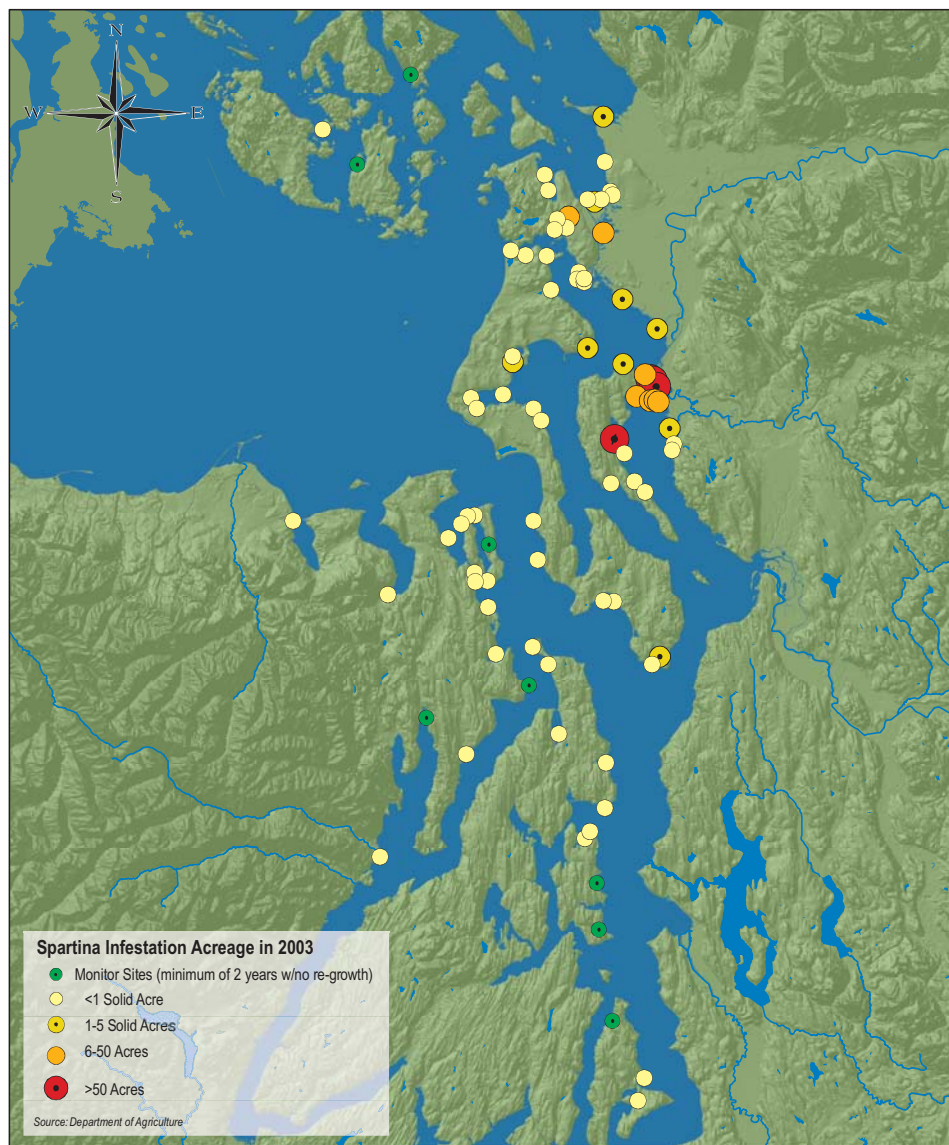
### Status

In Puget Sound, *spartina* spread from less than 15 acres in 1979 to 1,000 acres by 1997. By 2004, 680 acres infested the Sound.

### Trend

Agriculture estimates that there were 760 acres of *spartina* in the Sound at the beginning of the 2003 treatment season. By 2004, the agency and its partners reduced the infestation to 680 acres. From 1997 to the beginning of the 2004 treatment season, Agriculture reduced the total area of *spartina* in the Sound by 33 percent. Agriculture considers plants to be eradicated after two years without re-growth.

### Puget Sound *Spartina* Infestations



### Alien Sea Squirt Invades Puget Sound

A tunicate, or sea squirt, colony native to Europe has invaded Puget Sound. When a NOAA diver first noticed it in April 2004, the colony covered about two square feet on the wreckage of an old wooden boat sunk in the undersea park at Edmonds. The colony had grown to about six square feet by fall of 2004. The sea squirt's rapid reproduction can crowd out organisms, such as native sponges, anemones, mussels, and oysters. It has no known predators. In October 2004, volunteer divers tarped off the area and applied chlorine tablets to kill the animals.